

What Is Claimed Is:

1. (Comment: Load plus historical data base) A system for acquisitioning and accumulating data indicative of the operation of a haulage vehicle said system comprising:

first means mounted to said vehicle for providing data indicative of a loading of material onto a body of said vehicle;

a first processor means on-board said vehicle for acquiring data from at least said first means and organizing said data to provide information regarding the performance of said vehicle; and

a second means for accumulating said information from said first processor means so as to create a historical data base of haulage events defined by said information.

2. A system as set forth in claim 1 including third means mounted to said vehicle for providing data indicative of the direction of movement of said vehicle and delivering the data to said first processor means to be incorporated into said information.

3. A system as set forth in claim 2 wherein said third means is a compass.

4. A system as set forth in claim 2 herein said third means includes a device for detecting a forward-neutral-reverse status of a drive train associated with said haulage vehicle

5. A system as set forth in claim 1 including third means for providing data identifying said vehicle and distinguishing it from other vehicles and delivering the data to said processor means to be incorporated into said information.

6. A system as set forth in claim 5 including fourth means for sensing an unloading of said material loaded onto said body and providing data indicative of said unloading to said first processor means to be incorporated into said information; and

a fifth means responsive to said information for determining the elapsed time between said haulage events.

7. A system as set forth in claim 6 including a sixth means for incorporating data related to said elapsed time into said data base and a seventh means for deriving control data from said data base for routing said vehicle to selected locations.

8. A system as set forth in claim 5 including a fourth means and responsive to said first processor means for downloading said information to a remote site which includes said second means.

9. A system as set forth in claim 8 wherein said remote site includes a second processor means responsive to said downloaded information and said historical data base of haulage events for providing data for use in directing the future operation of said vehicle.

10. A system as set forth in claim 9 wherein said haulage vehicle is loaded by a bucket of a loading equipment and said first processor means includes means for determining the weight of each bucket and said historical data base of haulage events includes an average weight of a bucket over a plurality of loading cycles for said loading equipment.

11. A system as set forth in claim 8 wherein said haulage vehicle is loaded by a bucket of a loading equipment, said system including fifth means for determining when material carried by said bucket is loaded onto said body and incorporating said determination into said information.

12. A system as set forth in claim 11 wherein said sixth means includes means for determining the elapsed time from the loading of a first bucket in a load to the loading of a last bucket.

13. A system as set forth in claim 12 including sixth means for recording the identity of said loading equipment and associating said identity with said determination of when said bucket is loaded onto said body.

14. A system as set forth in claim 13 wherein said sixth means includes means for delivering said identity of said loading equipment and the associated determination of when said bucket is loaded onto said body to said first processor means to be incorporated into said information and made part of said historical data base of haulage events.

15. A system as set forth in claim 1 including third means mounted to said vehicle for marking data from said first means which an indication of time and delivering said marked data to said first processor means to be incorporated into said information.

16. A system as set forth in claim 1 including third means for providing data indicative of the unloading of said material by said body and delivering the data to said first processor means to be incorporated into said information.

17. A system as set forth in claim 1 including third means for providing data indicative of the distance traveled by said vehicle and delivering the data to said first processor means to be incorporated into said information

18. A system as set forth in claim 1 including third means for providing data indicative of the geographic location of said vehicle and delivering the data to said first processor means to be incorporated into said information.

19. A system as set forth in claim 1 including third means for providing data indicative of the entity controlling said vehicle and delivering the data to said first processor means to be incorporated into said information.

20. (Comment: Load plus time) A system for acquisitioning and accumulating data indicative of the operation of a haulage vehicle, said apparatus ~~comprising:~~

first means mounted to said vehicle for providing data indicative of a loading of material onto a body of said vehicle;

second means for providing data indicative of the relative time of events related to the hauling of said material sensed by at least said first means;

a first processor means on-board said vehicle for acquiring data from at least said first and second means and organizing said data to provide information regarding performance of said vehicle; and

a third means for accumulating said information from said first processor means so as to create a historical data base of haulage events defined by said information.

21. (Comment: Load plus dump) A system for acquisitioning and accumulating data indicative of the operation of a haulage vehicle, said system comprising:

first means mounted to said vehicle for providing data indicative of a loading of material onto a body of said vehicle;

second means for providing data indicative of the unloading of said material by said body;

a first processor means on-board said vehicle for acquiring data from at least said first and second means and organizing said data to provide

information regarding performance of said vehicle; and

a third means for accumulating said information from said first processor means so as to create a historical data base of haulage events defined by said information.

22. (Comment: Load plus distance) A system for acquisitioning and accumulating data indicative of the operation of a haulage vehicle, said system comprising:

first means mounted to said vehicle for providing data indicative of a loading of material onto a body of said vehicle;

second means for providing data indicative of the distance travelled by said vehicle;

a first processor means on-board said vehicle for acquiring data from at least said first and second means and organizing said data to provide information regarding performance of said vehicle; and

a third means for accumulating said information from said first processor means so as to create a historical data base of haulage events defined by said information.

23. (Comment: Load plus location) A system for acquisitioning and accumulating data indicative of the operation of a haulage vehicle, said system comprising:

first means mounted to said vehicle for providing data indicative of a loading of material onto a body of said vehicle;

second means for providing data indicative of the geographic location of said vehicle;

a first processor means on-board said vehicle for acquiring data from at least said first and second means and organizing said data to provide information regarding performance of said vehicle; and

a third means for accumulating said information from said first processor means so as to create a historical data base of haulage events defined by said information.

24. (Comment: Load plus Control No.) A system for acquisitioning and accumulating data indicative of the operation of a haulage vehicle, said system comprising:

first means mounted to said vehicle for providing data indicative of a loading of material onto a body of said vehicle;

second means for providing data indicative of the entity controlling said vehicle;

a first processor means on-board said vehicle for acquiring data from at least said first and second means and organizing said data to provide information regarding performance of said ~~vehicle; and~~

a third means for accumulating said information from said first processor means so as to create a historical data base of haulage events defined by said information.

25. (Comment: Load plus I.D. No.) A system for acquisitioning and accumulating data indicative of the operation of a haulage vehicle, said system comprising:

first means mounted to said vehicle for providing data indicative of a loading of material onto a body of said vehicle;

second means for providing data identifying said vehicle and distinguishing it from other vehicles;

a first processor means on-board said vehicle for acquiring data from at least said first and second means and organizing said data to provide information regarding performance of said vehicle; and

a third means for accumulating said information from said first processor means so as to create a historical data base of haulage events defined by said information.

26. (Comment: Load plus fuel) A system for acquisitioning and accumulating data indicative of the operation of a haulage vehicle, said system comprising:



first means mounted to said vehicle for providing data indicative of a loading of material onto a body of said vehicle;

second means for providing data indicative of fuel usage of said vehicle;

a first processor means on-board said vehicle for acquiring data from at least said first and second means and organizing said data to provide information regarding performance of said vehicle; and

a third means for accumulating said information from said first processor means so as to create a historical data base of haulage events defined by said information.

27. (Comment: Load plus Downloading) A system for acquisitioning and accumulating data indicative of the operation of a haulage vehicle, said system comprising:

first means mounted to said vehicle for providing data indicative of a loading of material onto a body of said vehicle;

second means for providing data identifying said vehicle;

a first processor means on-board said vehicle for acquiring data from at least said first and second means and organizing said data to provide information regarding performance of said ~~vehicle; and~~

a third means mounted to said vehicle for downloading said information to a remote site.

28. (Comment: Historical Data Base) A system as set forth in claim 27, said remote site including a second processor means for receiving said information, said second processor means including means for creating and updating a historical data base of haulage events defined by said information.

29. (Comment: Haul Cycle) A system for tracking the time of a haul cycle for a haulage vehicle, said system comprising:

first means mounted to said vehicle for sensing the loading and unloading of a load carried by said vehicle;

second means for identifying said vehicle;

a first processor on-board said vehicle responsive to said first and second means for generating data indicative of the dumping or loading of said load and associating said data with said data identifying said vehicle to form a data stream; and

second means responsive to said data stream for determining the time of a haul cycle [to be defined in specification] for said vehicle.

30. A system as set forth in claim 29 including:

third means for creating a data base from said haul cycle times and processing said data stream to derive control data for commanding the routing of said vehicle to selected locations.

add B1

add C2